

Amendments to the Claims

The following listing of the claims will replace all prior versions and listings of claims in the application.

Listing of the Claims

1. (currently amended) A process for isolating nucleic acids comprising the following steps:

- charging a non-siliceous membrane surface from a given direction with nucleic acids, wherein said non-siliceous membrane surface has a top side and an two opposing sides waste side and wherein said non-siliceous surface has pores that have a diameter of at least 0.2 μm ;
- immobilizing the nucleic acids on one the top side of the non-siliceous membrane by binding the nucleic acids to said one side of the membrane in the presence of an immobilization buffer surface in the presence of:
 - a salt selected from the group consisting of: a salt of an alkaline or alkaline earth metal with a mineral acid; a salt of a monobasic, polybasic, or polyfunctional organic acid with an alkaline or alkaline earth metal; a chaotropic trichloroacetate, thiocyanate, perchlorate, or iodide salt; guanidinium hydrochloride; and combinations thereof, wherein said salt is at a concentration of at least 10 mM;
 - and
 - an alcohol selected from the group consisting of: a C1-C5 alkanol; a polyvalent C1-C5 alkanol; a phenol; and a polyphenol;
- releasing the immobilized nucleic acids from the non-siliceous membrane surface by applying to the non-siliceous surface an elution agent, wherein said elution agent is water or an aqueous salt solution wherein the released nucleic acids do not pass through to the other side of the non-siliceous membrane; and
- removing the released nucleic acids from the same top side of the non-siliceous membrane surface on which the nucleic acids were immobilized,

wherein the released nucleic acids are removed without retrieving materials that have contacted the other waste side of said non-siliceous membrane surface.

2. (canceled)

3. (currently amended) The process according to claim 1, wherein, between the immobilization and release steps, a washing of the immobilized nucleic acids with at least one washing buffer takes place without releasing the nucleic acids from the membrane.

4. (currently amended) The process according to claim 3, wherein the washing includes the following steps for each washing buffer:

- transferring a predetermined amount of washing buffer to the non-siliceous membrane surface, and
- drawing the washing buffer through the non-siliceous membrane surface by suction or centrifugation.

5. (currently amended) The process according to claim 1 further comprising the following steps:

- mixing of the nucleic acids with the immobilization buffer said salt and said alcohol;
- charging of the nucleic acids mixed with the immobilization buffer said salt and said alcohol on to the non-siliceous membrane surface;
- drawing the fluid components of the mixture through the non-siliceous membrane surface.

6. (withdrawn) The process according to any of claims 1, 2 or 4, wherein at least one of the steps is carried out completely automatically by means of an automatic machine.

7. (withdrawn) The process according to claim 6, wherein all the steps in the process are carried out by an automatic machine in a controlled sequence.

8. (withdrawn) The process according to claim 6, wherein multiple isolations of nucleic acids are carried out simultaneously using a multiplicity of surfaces.
9. (previously presented) The process according to claim 1, characterized by the fact that between the release and the removal steps at least one chemical reaction is carried out on the nucleic acids.
10. (currently amended) The process according to claim 5, wherein said immobilization buffer salt includes aqueous solutions of salts of alkaline and alkaline earth metals with mineral acids.
11. (currently amended) The process according to claim 10, wherein said immobilization buffer salt includes alkaline or alkaline earth halogenides or sulfates.
12. (currently amended) The process according to claim 11, wherein said immobilization buffer ~~alkaline or alkaline earth halogenides or sulfates~~ includes halogenides of sodium or potassium or magnesium sulfate.
13. (currently amended) The process according to claim 5, wherein the immobilization buffer ~~said salt~~ includes aqueous solutions of salts of monobasic or polybasic or polyfunctional organic acids with alkaline or alkaline earth metals.
14. (previously presented) The process according to claim 13, wherein said aqueous solutions of salts of polyfunctional organic acids with alkaline or alkaline earth metals includes aqueous solutions of salts of sodium, potassium, or magnesium with organic dicarboxylic acids.
15. (original) The process according to claim 14, wherein said organic dicarboxylic acid is oxalic acid, malonic acid, or succinic acid.
16. (previously presented) The process according to claim 13, wherein said aqueous solutions of salts of polyfunctional organic acids with alkaline or alkaline earth metals includes aqueous

solutions of salts of sodium or potassium in combination with hydroxycarboxylic or polyhydroxycarboxylic acid.

17. (original) The process according to claim 16, wherein said polyhydroxycarboxylic acid is citric acid.

18. (canceled)

19. (canceled)

20. (canceled)

21. (canceled)

22. (currently amended) The process according to claim 5, wherein said immobilization buffer includes said alcohol is a phenol or polyphenol.

23. (canceled)

24. (original) The process according to claim 1, wherein the releasing step is carried out using an aqueous salt or buffer solution.

25. (currently amended) The process according to claim 1, wherein the nucleic acids immobilized on the non-siliceous membrane surface are released using water.

26. (currently amended) The process according to claim 5, wherein said immobilization buffer comprises an aqueous solution of a chaotropic agent salt is a chaotropic trichloroacetate, thiocyanate, perchlorate, or iodide salt, or guanidinium hydrochloride.

27. (currently amended) The process according to claim 26, wherein the chaotropic agent salt is selected from the group consisting of trichloro-acetates, thiocyanates, perchlorates, iodides, guanidinium hydrochloride, and guanidinium isothiocyanate, and urea.

28. (currently amended) The process according to claim 26, wherein said immobilization buffer salt comprises a 0.01-molar to 10-molar aqueous solution of the chaotropic agent salt.
29. (currently amended) The process according to claim 28, wherein said immobilization buffer salt comprises a 0.1-molar to 7-molar aqueous solution of the chaotropic agent salt.
30. (currently amended) The process according to claim 29, wherein said immobilization buffer salt comprises a 0.2- molar to 5-molar aqueous solution of the chaotropic agent salt.
31. (currently amended) The process according to any one of claims 26 and 28 through 30, wherein said immobilization buffer comprises an aqueous solution of salt is selected from the group consisting of sodium perchlorate, guanidinium hydrochloride, guanidinium isothiocyanate, sodium iodide, or and potassium iodide.
32. (canceled)
33. (currently amended) The process according to claim 1 32, wherein the membrane is a hydrophobic membrane.
34. (original) The process according to claim 33, wherein the hydrophobic membrane is made of a polymer with polar groups.
35. (currently amended) The process according to claim 1 32, wherein the membrane is a hydrophilic membrane with a hydrophobisized surface.
36. (currently amended) The process according to claim 1 32, wherein the membrane is composed of a polymeric material selected from the group consisting of nylon, a polysulfone, polyether sulfone, polycarbonate, polyacrylate, acrylic acid copolymer, polyurethane, polyamide, polyvinyl chloride, polyfluorocarbonate, polytetrafluoroethylene, polyvinylidene fluoride,

polyvinylidene difluoride, polyethylene tetrafluoroethylene copolymerisate, polyethylene chlorotrifluoroethylene copolymerisate, and polyphenylene sulfide.

37. (previously presented) The process according to claim 36, wherein the nylon is hydrophobisized nylon.

38. (previously presented) The process according to claim 36, wherein the membrane is coated with a hydrophobic coating agent selected from the group consisting of paraffins, waxes, metallic soaps, quaternary organic compounds, urea derivates, lipid-modified melamine resins, organic zinc compounds, and glutaric dialdehyde.

39. (currently amended) The process according to claim 1 32, wherein the membrane is a hydrophilic or hydrophilized membrane.

40. (original) The process according to claim 39, wherein the membrane is composed of hydrophilized nylon, polyether sulfone, polycarbonate, polyacrylate, acrylic acid copolymer, polyurethane, polyamide, polyvinyl chloride, polyfluorocarbonate, polytetrafluoroethylene, polyvinylidene fluoride, polyvinylidene difluoride, polyethylene tetrafluoroethylene copolymerisate, polyethylene chlorotrifluoroethylene copolymerisate, or polyphenylene sulfide.

Claims 41-50. (canceled)

51. (currently amended) A process for isolating nucleic acids comprising:

(1) immobilizing nucleic acids on one a top side of a non-siliceous membrane by binding the nucleic acids to said one side of the membrane in the presence of an immobilization buffer, followed by said membrane defining a top side and a waste side thereof and having pores of a diameter of at least 0.2 µm, said immobilizing step taking place in the presence of:

~~— a salt selected from the group consisting of a salt of an alkaline or alkaline earth metal with a mineral acid; a salt of a monobasic, polybasic, or polyfunctional organic acid with an alkaline or alkaline earth metal; a chaotropic trichloroacetate, thiocyanate,~~

~~perchlorate, or iodide salt; a guanidinium hydrochloride salt; and combinations thereof, wherein said salt is at a concentration of at least 10 mM; and~~
~~an alcohol selected from the group consisting of a C1-C5 alkanol; a polyvalent C1-C5 alkanol; a phenol; and a polyphenol;~~
~~wherein the nucleic acids are immobilized on the top side of said membrane in the absence of a cationic detergent;~~

(2) releasing the immobilized nucleic acids from the membrane by applying to the membrane an elution agent, ~~wherein said elution agent is water or an aqueous salt solution, wherein the eluted nucleic acids do not pass through to the other side of the non-siliceous membrane;~~ and

(3) collecting the released nucleic acids from the same ~~top~~ side of the membrane on which the nucleic acids were immobilized;
wherein the nucleic acids are collected without retrieving materials that have contacted the waste side of said membrane;
wherein the membrane comprises a material selected from the group consisting of nylon, polysulfone, polyether sulfone, polycarbonate, polyacrylate, acrylic acid copolymer, polyurethane, polyamide, polyvinyl chloride, polyfluorocarbonate, polytetrafluoroethylene, polyvinylidene fluoride, polyvinylidene difluoride, polyethylene tetrafluoroethylene copolymerisate, polyethylene chlorodifluoroethylene copolymerisate, and polyphenylene sulfide; and wherein the membrane material is hydrophilic, hydrophobic, hydrophilisized, or hydrophobisized.

52. (canceled)

53. (previously presented) The process according to claim 51, wherein the membrane is a hydrophobisized nylon membrane.

54. (previously presented) The process according to claim 51, wherein the membrane is a hydrophilic membrane, which is coated with a hydrophobic coating agent selected from the

group consisting of paraffins, waxes, metallic soaps, quaternary organic compounds, urea derivates, lipid-modified melamine resins, organic zinc compounds, and glutaric dialdehyde.

55. (previously presented) The process according to claim 51, wherein said process for isolating nucleic acids is carried out in a plurality of isolation devices installed on a multi-well plate.

56. (withdrawn) An apparatus adapted to the automatic performance of a process according to any one of claims 1 through 49.

57. (withdrawn) The apparatus of claim 56, comprising at least one vacuum apparatus suitable for automatically carrying out the application of buffers and solutions to a surface in an isolation device and automatically removing buffers and solutions away from the surface.

58. (canceled)

59. (previously presented) The process according to claim 3, wherein the washing step is carried out using an aqueous solution of a salt of an alkaline or alkaline earth metal with a mineral acid.

60. (previously presented) The process according to claim 3, wherein the washing step is carried out using an aqueous solution of a salt from a monobasic, polybasic, or polyfunctional organic acid with an alkaline or alkaline earth metal.

61. (previously presented) The process according to claim 3, wherein the washing step is carried out using an aqueous solution of a chaotropic agent.

62. (currently amended) The process according to claim 3, wherein the washing step is carried out using a hydroxyl derivative of an aliphatic or acyclic saturated or unsaturated hydrocarbon C1-C5 alkanol.

63. (previously presented) The process according to claim 3, wherein the washing step is carried out using a phenol or a polyphenol.

64. (previously presented) The process according to claim 38 or claim 54, wherein said metallic soaps are in admixture with aluminum or zirconium salts.

65. (not entered) The process according to claim 41, wherein the membrane has pores which have a range of diameters from 0.01 to 20 micrometers.

66. (not entered) The process according to claim 41, wherein the membrane has pores which have a range of diameters from 0.05 to 10 micrometers.

Claims 67-68 (canceled)

69. (currently amended) The process according to claim 51, further comprising the steps of:

- mixing the nucleic acids with said immobilization buffer salt and said alcohol,
- charging the nucleic acids mixed with said immobilization buffer salt and said alcohol onto the membrane,
- optionally, washing the nucleic acids immobilized on the membrane,
- drawing the unbound fluid components of the mixture or wash buffer through the membrane.

70. (currently amended) The process according to claim 69, wherein said immobilization buffer salt includes aqueous solutions of salts of alkaline and alkaline earth metals with mineral acids.

71. (currently amended) The process according to claim 69, wherein said immobilization buffer salt includes aqueous solutions of salts of monobasic or polybasic or polyfunctional organic acids with alkaline or alkaline earth metals.

72. (currently amended) The process according to claim 69, wherein said immobilization buffer includes hydroxyl derivatives of aliphatic or acyclic saturated or unsaturated hydrocarbons ~~alcohol is a C1-C5 alkanol.~~

73. (currently amended) The process according to claim 69, wherein said immobilization buffer includes alcohol ~~is a phenol or polyphenol.~~

74. (currently amended) The process according to claim 51 or claim 69, wherein ~~said salt is a chaotropic agent is used for the immobilization of the nucleic acids trichloroacetate, thiocyanate, perchlorate, or iodide salt; or guanidinium hydrochloride.~~

75. (canceled)

76. (previously presented) The process according to claim 51 or claim 69, wherein said C1-C5 alkanol is selected from the group consisting of methanol, ethanol, n-propanol, isopropanol, tert.-butanol, and pentanols.

77. (new) The process according to Claim 1, wherein the non-siliceous membrane is oriented so that one of the two opposing sides of the non-siliceous membrane is on top of the other side so that the nucleic acids are charged on and removed from the top side of the non-siliceous membrane.

78. (new) The process according to Claim 5, wherein the immobilization buffer includes hydroxyl derivatives of aliphatic or acyclic saturated or unsaturated hydrocarbons.

79. (new) The process according to Claim 78, wherein said hydroxyl derivatives are C1-C5 alkanols.

80. (new) The process according to Claim 79, wherein said C1-C5 alkanol is selected from the group consisting of methanol, ethanol, n-propanol, isopropanol, tert.-butanol, and pentanols.

81. (new) The process according to Claim 78, wherein said hydroxyl derivative is an aldite.
82. (new) The process according to any one of Claims 1 and 33-40, wherein the membrane has pores which have a range of diameters of 0.001 to 50 micrometers.
83. (new) The process according to Claim 1, wherein a chaotropic agent is used for the immobilization buffer.
84. (new) The process according to Claim 83, wherein the chaotropic agent is selected from the group consisting trichloro-acetates, thiocyanates, perchlorates, iodides, guanidinium hydrochloride, guanidinium isothiocyanate, and urea.
85. (new) The process according to Claim 83, wherein a 0.01 molar to 10 molar aqueous solution of the chaotropic agent is used for the immobilization buffer.
86. (new) The process according to Claim 85, wherein a 0.1 molar to 7 molar aqueous solution of the chaotropic agent is used for the immobilization buffer.
87. (new) The process according to Claim 86, wherein a 0.2 molar to 5 molar aqueous solution of the chaotropic agent is used for the immobilization buffer.
88. (new) The process according to any one of Claims 83-87, wherein the chaotropic agent is selected from the group consisting of sodium perchlorate, guanidinium hydrochloride, guanidinium isothiocyanate, sodium iodide, and potassium iodide.
89. (new) The process according to any one of Claims 5, 51, 53-55, and 69, wherein the immobilization buffer has a pH of from 3 to 11.

90. (new) The process according to Claim 82, wherein the membrane has pores that range from 0.01 to 20 micrometers in diameter.

91. (new) The process according to Claim 82, wherein the membrane has pores that range from 0.05 to 10 micrometers in diameter.